POPULAR MECHANICS

An Illustrated Weekly Review of the Mechanical Press of the World

TELLS YOU HOW TO DO THINGS. WRITTEN SO YOU CAN UNDERSTAND IT

Vol. 1, No. 21. CHICAGO, MAY 31, 1902. PRICE 5 CENTS.

Remarkable Cement Bridge in Paris

Bridge and Retaining Walls, Quai Debilly, Paris.**—See page 323.**

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FOR SALE BY ALL NEWSDEALERS.

MAY 29 1902

TORPEDO BOATS SAID TO BE IMPRACTICABLE.

Men Operating Them Are in More Danger of Death Than the Enemy.

The submarine boat is not a success, many declare, because the persons on board of them are in more danger than the enemy. Steam was found impracticable and so deadly gasoline has been adopted as the source of power. The recent explosion of the Fulton in which five of the occupants were seriously injured attests the impracticability of gasoline as a motive power. A short time before gasoline fumes from the engines nearly killed the entire crew of one of the Holland boats. Sven men were made insensible and some of them did not recover for a number of days. The American Shipbuilder says:

"Had an electric switch been 'thrown' or a 'short circuit' occurred at any point this boat and its crew would have been blown to atoms. A death more awful than being blown to pieces penned in under the surface of the water in difficult to imagine."

Other accidents have been numerous. The Russian government regards gasoline as more dangerous than dynamite and will not permit it to be brought within several miles of government property. This is the reason the Russian navy has not yet adopted the submarine torpedo boat. A glance at the statistics of fatalities due to gasoline explosions in this country is appalling. Many of these explosions are due to spontaneous combustion or molecular change without the aid of any exterior agency whatsoever. Others are due to heat, flame or an electric spark. The present type of submarine torpedo boat is designed to carry at least 1,000 gallons of gasoline or naptha. This enormous quantity of explosive is stored in tanks in the vessel's hull. Each submarine boat carries an immense storage battery in close proximity to the gasoline tanks and piping. Sparks frequently jump from cell to cell of this battery and the charging wires. The switches fuses and the various electrical contacts necessary to the control of the boat's machinery are open to the air. Each time these devices are operated sparks, often larger than an arc light, are formed.

EDISON ADVISES SANTOS DUMONT.

Tells Him to Do Away With the Balloon Feature of His Airship —Instances the Vulture.

"I am sure you never worked on the problem of aerial navigation," said Santos Dumont to Thomas A. Edison, not long ago. "You would have accomplished years ago more than I have done now."

"I don't know about that," replied Edison. "I did take it up several years ago and built a specially light motor to be operated by exploding gunpowder. I experimented a lot in lifting weights with it, but I worked with a small model and did not attempt to fly. I gave it up because I had a number of other things to do which were far more profitable.

"I tell you if the patent office only protected the inventor sufficiently the problem of aerial navigation would have been solved long ago. But you are on the right track. You have made an airship and you have steered it. Keep it up, but get rid of your balloon. Make it smaller all the time. When you get your balloon part smaller and yet smaller until it is so small that you cannot see it with a microscope, then you will have solved the problem.

"Take the case of a vulture; here is a natural flying machine which is a thousand times heavier than the air it displaces. In a few seconds of leisurely flight it can sweep over a distance which man finds incumbered with all sorts of obstacles, and there is scarcely a flutter of its wings in the operation."

MECHANICAL TRAINING SCHOOLS DEFICIENT.

Instructors and Machinery Do Not Keep Pace With the Rapid Strides of Progress.

By S. M. Vauclain, Superintendent of the Baldwin Locomotive Works.

While I do not wish to detract in any way from the good influence of mechanical training schools, it is a fact that these schools are lamentably behind the times in all that appertains to the various trades as practiced in America. Instructors are handicapped by the fact that to be a successful teacher in this branch of education it is necessary to be in constant contact with the practical workshops of the country, and to have at their command all the improvements that are made in the way of labor saving appliances and improved methods of operation, so that, when graduated, their students may be at least abreast of the times and ready to proceed with their work in some one of the many great workshops. The financial difficulty, however, interferes in almost every case and in many of the workshops connected with educational institutions the machinery and appliances provided are lamentably deficient.

If workshops, which are already thoroughly equipped with valuable and efficient teachers, were organized as manual training schools that would pay to each student sufficient money to at least furnish him with the "bread of life." in place of, as in our present system, consuming his time without compensation and at a considerable outside expense, such schools would turn out men, not only trained from a mechanical point of view, but so trained on the commercial side of the profession as to make them a financial as well as a mechanical acquisition to our country, provided the ground work in algebra, geometry, mechanical drawing, etc., had been built upon. The Baldwin Locomotive Works is endeavoring to start this great system of education.

WATER USED BY AMERICAN CITIES.

Buffalo the Thirstiest City on Earth—Louisville Uses Much for Chasers.

Residents of Buffalo, N. Y., use more water than any other people in the world. The average consumption in that city is 440 gallons (more than 14 barrels per day for each person. The people of Louisville use less water than any other in America The average consumption of the "kunnels" of that city being but 50 gallons a day, used principally as "chasers." Chicago and Philadelphia rank next to Buffalo, each person using 200 gallons a day, according to the average. Milwaukee averages a consumption of nearly 150 gallons for each person, which is attributed to the enormous amount required by the breweries. Most of the water in St. Louis is also consumed by the breweries, very little being used for drinking purposes. The New Yorker requires 120 gallons (four barrels) of water a day to satisfy his needs. Speaking of the great increase of New York's consumption the Water and Gas Review says:

"Statistics show that the per captita consumption of New York is increasing in proportion to the supply obtainable. In 1880 it was 77 gallons per day; in 1899 it was 119 gallons; it is over 120 gallons now, and this condition has been the experience of every city in this country and in Europe.

"When one realizes that the city of London uses from 35 to 40 gallons per inhabitant per day for all purposes and that many of the best European cities use even less, there seems to be some discrepancy which cannot all be ascribed to increased cleanliness.

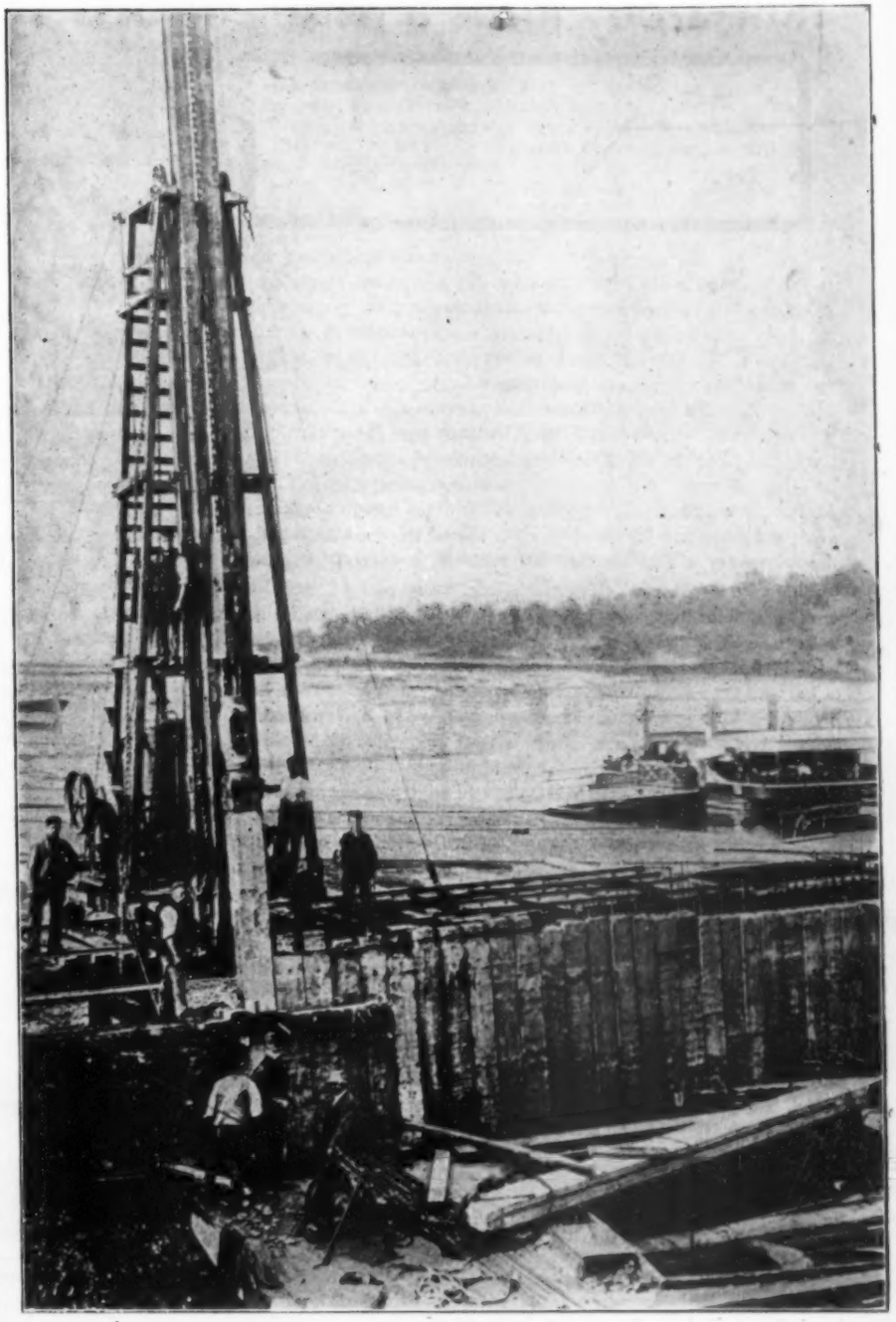
NEW FIREPROOF CONSTRUCTION.

Is the use of wood in the construction of buildings becoming obsolete? Is the time near at hand when not one particle of wood need enter into the construction of a house or public building. With the cutting down of our forests vastly faster than they can ever grow again it is only a matter of a comparatively short time when the trees will be used up and people will have to use other materials to make the things now made of wood.

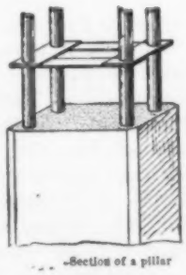
Iron and brick and stone already have largely displaced wood. In office buildings almost no wood is used, the floors being made of fireproof materials and the walls of steel, terra cotta and brick. In Chicago recently there was completed a large church in which there is not a particle of wood; even the vaulted arches are of brick and the window frames and doors of metal.

In the advance in fire proof construction cement has taken a prominent place, and whole buildings are now built of steel and cement. Railroads are making culverts of cement formed in great arches which harden into what becomes one solid block of stone some of them 50 feet long. But one of the greatest discoveries is that made by a French engineer, Hennibique, who has devised a system of embedding steel rods and beams in cement and thus securing the same strength in a mass of concrete a few inches thick that was formerly possible only with a thickness of as many feet, and in some cases could not be made at all. He places steel rods in position similar to the truss rods which we see under railway cars, and then by means of wooden forms pours cement around them. This, when hardened, furnishes great strength and is absolutely fireproof. The hottest fire may rage below and around it, but the cement protects the steel and the structure is unharmed. This system has already become known abroad and has been put to many uses. Our illustration on the front page shows one of the bridges and retaining walls recently completed in Paris. The bridge carries the traffic of a cross street and our readers will notice its slender and graceful appearance. The cut on this page shows a very remarkable occurrence. At Southampton, England, it was decided to erect a mammoth warehouse on the shore. The ground was soft and unable to support so large a structure. Hennebique solved the trouble by constructing posts of cement. These stone posts or piles were each 45 feet long, and 14 inches square and were driven with an ordinary pile driver striking a blow with a 6,000-pound hammer. These piles will last 1,000 years; no insects can ever attack them.

R. Baffrey is manager of the company for the United States.

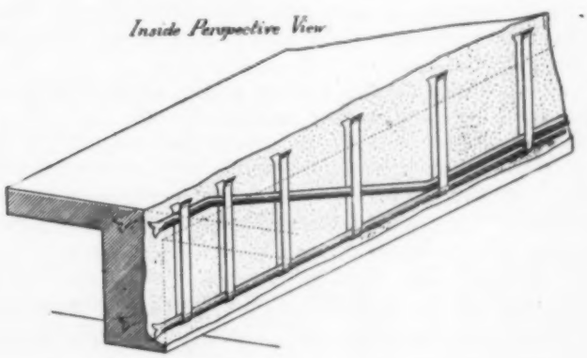


Driving Cement Piles at Southampton, England.



Section of a pillar

Inside Perspective View



How a Boy Made a Set of Wireless Telegraph Instruments

Being an account by J. J. Rezab, a member of the Junior Class in the High School, at Winona, Minn., of how he made a working wireless telegraph. The demonstration was made out of doors and witnessed by the High School teachers and students. From this description any bright boy can make the set.

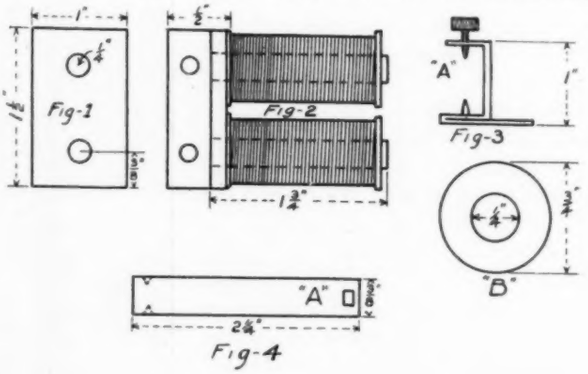
Every one has observed the waves produced by a stone which is thrown into a quiet pond or lake and how these waves travel, spreading out farther and farther until they are no longer visible. If these undulations could influence some instrument placed in the water, so that it could be affected at certain intervals, we could have by some prearranged code a system in which messages could be sent. Now the electric spark is known to produce such waves in the air; in this case, however, in all directions, and on the instrument capable of receiving these vibrations, depends the success of wireless telegraphy. This is commonly called a coherer. But to render it more sensitive in great distances a relay must be used. Both will be considered in the following, so that any one can make them and attain success.

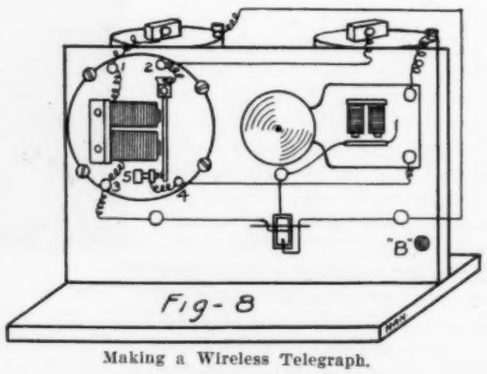
To make a coherer. Procure a thin brass tube 5/8 inch long with a 3-16 inch bore and two pieces of No. 18 German silver wire 4 inches long. Now fit each end of the tube, very tightly, with little caps made of mica or dry wood so as to project into it not more than 1-16 inch. Into one of these caps bore a hole through which one of the German silver wires will with difficulty be pushed through. Take one of the wires and folding the end around the middle of tube solder it in place, filing off any excess of solder. Introduce the end of the other wire into the hole of the cap, having it project 1/8 inch and bend it with the other one as shown in Fig. 5. Shape a thin piece of mica or wood of the form A, Fig. 5, making the central hole fit the tube, and the other two, the wires. Slip the piece over the wires and tube and bend the wires at right angles, Fig. 6. It is now necessary to fill the tube with metallic antimony. This is to be crushed to the size of poppy seed. Be careful of handling it very much, as the perspiration of the hand is liable to affect the working of the metal. Do not, however, put in so much antimony that the top cap touches it. The coherer is now complete.

The relay is simply a very delicate electro-magnet, with a swinging armature in front of its poles. The wire used is 1 oz. No. 36 copper covered. The dimensions are as shown in the figures 1, 2, 3, 4 and 7. Fig. 1 is a piece of iron 1/8 inch thick through which the iron cores pass, and it stands up soldered to a brass piece, which has two holes drilled for screwing it to the circular base, Fig. 2. Fig. 3, A is made from a brass piece 1/4 inch wide and 1-16 inch thick, a frame to hold the armature, Fig. 4. This armature is of iron 1/8 inch thick and has tiny holes drilled at the ends to contain the screw at the top and the point at the bottom of the frame, Fig. 3 A. At A, Fig. 4, is soldered a piece of platinum foil. Fig. 7 shows it complete. Fig. 3, B, is one of the spool ends of the electro-magnet. One caution here is necessary. Have the iron cores and armature perfectly annealed.

To fix the relay in place cut out a piece of wood 1/8 inch thick and 4 inches in diameter, making a circular disk. Then adjust the different parts as shown on the left hand of Fig. 8, making the armature be parallel to the poles of the magnet without touching. Secure four telephone terminals in places indicated by 1, 2, 3, 4 and connect with the wires. Opposite the platinum on the armature fix a screw, with a platinum point so that it will touch when drawn by the magnet.

A bell and two dry batteries must be obtained. On the hammer of the bell solder a stiff wire 1 inch long in position shown by illustration. This is called a decoherer. It is convenient to make a wooden frame for holding the apparatus in position. The one in Fig. 8 is a fairly good one and shows also the whole instrument as it should be when set up. The coherer is held between two binding posts with the top cap of the tube directly beneath the decoherer and clearing it by 1-16 inch. Fasten the relay by four screws in such a way that the circular frame may





Making a Wireless Telegraph.

be slightly revolved. The connections are made by No. 25 copper covered wire to the various parts indicated.

To make it work. See that all parts are rightly connected, have the armature just clear the poles and not touching the bottom screw. Take a position of about twenty feet away from it, and make a spark either by a plate machine or induction coil. The bell may ring. If it does not, connect one of the binding posts holding the coherer with a wire leading to the ground and the other binding post to a stiff wire pointing into the air. The distance may be increased with a correspondingly greater spar and longer wing as the stiff wire is called. To avoid polarization of batteries, disconnect them when not in use.

The reason why the bell, or other instrument in place of the bell is affected is very simple. By looking at the diagram one sees that the battery current must first pass through the metallic antimony before it can make the relay a magnet. But fortunately the antimony offer such great resistance that the current cannot pass. As soon as the spark reaches it, however, the resistance is reduced, the current passes, the armature is drawn and by closing this second circuit rings the bell. But the instant the bell taps the decoherer by the rebound of the hammer strikes the coherer and again establishes the resistance.

AN ACCOMMODATING FIRE IN CINCINNATI.

In Cincinnati a fire company, instead of having to make a run to a fire, had the fire brought to it. Behind horses that strained their every muscle under the driver's lash the fire dashed through the streets of the town followed by an anxious crowd. It wheeled the corners without loss of time and never paused until the flames were shooting up directly in front of Engine Co. No. 2. The fire-fighters gave a glance at the accommodating fire and then standing almost in their tracks turned on the hose and proceeded to put it out. The driver of the fire was uninjured.

It was a big load of highly inflammable wood that was burning. It was purchased by a baker at a dump where there was a ground fire that ignited his load. He could not afford to wait for the fire company to arrive and so drove rapidly to the engine house. The engine foreman says it is the first instance on record of firemen remaining at their station and having the fire make a run to them.

The secretary of the navy in a naval appropriation bill is directed to appoint a board composed of naval officers to recommend a suitable site for a naval training station at some point on the shores of the great lakes.

Officials of the Southern Pacific railroad are convinced that tea can be raised in Southern Oregon and hence have sent a number of tea plants to Grant's pass, Medford, Ashland and Jacksonville where the industry will be given a thorough test.

A charter to build a standard gauge road between San Antonio, Tex., and Crowther, the new oil city located 60 miles southeast of San Antonio, has been granted by the Secretary of State of Texas.

Capt. A. Albers of the steamer Deutschland, who died at Hamburg of apoplexy, was the commodore of the Hamburg-American line and had been at sea since a lad of 13 years.

J. Pierpont Morgan is back of a $130,000,000 corporation which purposes to construct an underground railroad system in London to rival Charles T. Yerkes' scheme of obtaining possession of all the intermural transportation.

The longest name in America was discovered at Wilkesbarre, Pa., last week, when there appeared in the clerk's office a judgment note against Franciska Radwinawiczenabarillaramini of Pittson.

Herman Dick of Chicago, representing Thomas A. Edison, has formed a company in London with a capital of $10,000,000 to utilize Edison's patent in extracting iron from ore on the west coast of Norway.

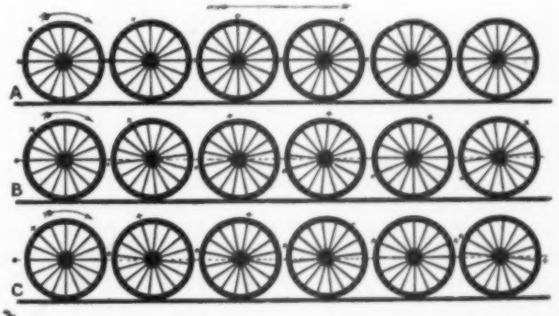
The rise in the price of beans threatens a serious uprising in Boston where the people are arranging for mass meetings to make public denunciation of the "bean trust." They might throw the beans into the bay, and start another revolution.

EXPLANATION OF CURIOUS CINEMATOGRAPH ILLUSION.

Have you ever noticed in watching a "moving picture" in which some vehicle passes, that the wheels seem to skid or slide along instead of turning? The Photo-Beacon gives the following explanation:

The effects described in the question may be said to be due to an error of the spectator, who simply mistakes one spoke of the wheel for another, all the spokes being alike. If the wheel had only two spokes, the illusion would not appear, but the spectator would become aware, by the jerkiness of the effect, that the wheel was traveling too fast for the cinematograph, which is the real cause of the various illusions described.

Assume that the cinematograph makes 64 exposures per second. In the cut row A represents six exposures on the wheel, making four revolutions per second in the direction of the arrow. As there are sixteen spokes, at each exposure each spoke has moved forward to the place occupied by the adjacent spoke at the last exposure. Therefore, if the spectator fixes his attention on one spoke, say the one marked by a dot, that spoke never appears to move at all, and the wheel seems to simply skid along the ground. The real motion of the wheel is indicated in the figure by the cross; but this real motion is not apparent to the spectator, as all the spokes are alike.



Next, suppose the wheel to be making three revolutions per second (see row B). This is a slower real speed than before, as indicated by the crosses, and at each exposure each spoke only travels three-quarters of the distance that it did in the former case. The spectator will now see a movement of the spokes, but if with one view he fixes his attention on the spoke marked by the dot, in the next view he will transfer his attention to the spoke nearest the apposition, which happens to be the succeeding spoke.

As this spoke has not yet reached the position of the former one, the wheel appears to be traveling backward, the apparent motion being indicated by the dots in the figure.

In the last case, in row C, the wheel makes five revolutions per second, and the true motion is indicated by crosses, as before. The apparent motion is shown by dots, and in this case each spoke has traveled one and a quarter times the space between two spokes at each exposure, but the spectator again confuses the spokes, and only allows a quarter of a space as the movement. This makes the wheel revolve in the right direction, but apparently at only one-fifth the proper speed.

The only way to prevent the spectator from confusing the spokes is to arrange matters so that the movement of a spoke at each exposure is less than half the space between two spokes. In the particular case we have considered the speed of the wheel must be less than two revolutions per second to produce a perfectly natural effect.

The world's ships carry 180,000,000 tons of merchandise a year. Of this one-fourth by weight is coal and one-tenth wheat.

There are more naval officers at sea now than ever before in peace times, according to a statement just prepared by the navy department.

Easy Electrical Experiments
FOR BOYS

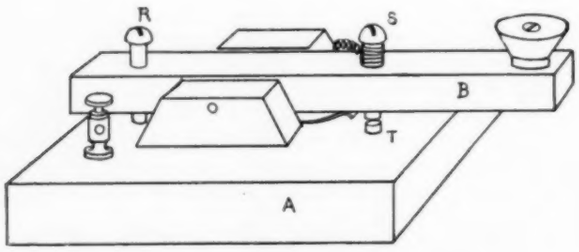
By L. P. Dickinson

CHAPTER XXI.

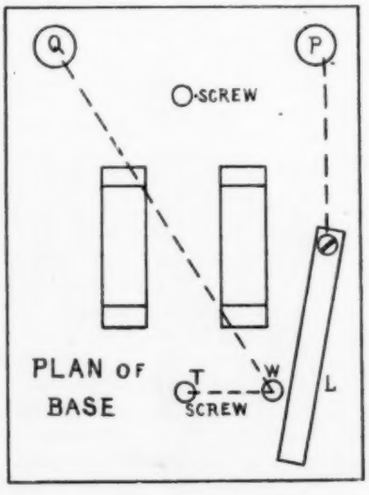
HOW TO MAKE A TELEGRAPH INSTRUMENT.

PART III.

The instrument described in the preceding paper is for the purpose of ticking out the messages which come over the wire. These messages are sent in obedience to the hand of the operator, who works a "key" so-called, which is simply an instrument for opening and closing, with accuracy, an electric circuit. All that we shall have to do to make our set complete is to make this key.



Cut out a piece of board, 4 inches long, 3 inches wide, and ⅝ inch thick. Draw a line lengthwise through the middle. On this line, and ¾ inch from one end bore a small hole. On the under side of the board enlarge this hole so that a 1-inch brass screw may be screwed up through the hole, and its head be sunk below the level of the bottom of the board. File this screw off where



it projects above the top of the board so that it projects ⅛ inch above the surface, and is flat on its upper end. At the other end of the board insert a similar screw. Also at a point half between the first screw and the edge of the board, insert another screw in the manner described. This board is shown at A in the accompanying figure.

From a piece of sheet brass or copper cut a piece 2 inches long and ¼ inch wide. Bore a hole through one end, and fasten this end to the board by a screw located ¼ inch from the right hand edge and in the middle of that edge. This strip should be loose enough so that it may be moved sidewise easily.

Make a piece of wood such as is shown at B, 5 inches long and ⅜ inches square. At one end mount a knob, made by sawing a small spool in halves. At a distance of 1⅞ inches from this end bore a hole large enough to take a 1 inch brass crew. The hole may be burned out as described in the last paper if no drill be available. The lower end of the screw should be filed flat. At a distance of ⅝ inches from the other end insert a similar screw. The distance between these screws should then be 2½ inches, which is the same as the distance between the two central screws on the base board.

The lever B is now to be mounted between two blocks screwed to the base board as shown in the figure. It should be at such a height that its under edge is ⅝ inch from the base, and is so placed that the two screws, S and R are above the two screws in the base board. A stout round nail held in the upright blocks, passes through the lever B. It should fit the latter tightly, but should be loose enough in the block so that B may move easily up and down. There should be no side movement of the lever, however.

Take a piece of old clock spring, and soften one end by holding it in a flame. Punch two holes through it, and fasten it to the base board, underneath the lever, in such a manner that it presses upward on the front end of the lever, and holds the latter up so that the two screws S and T will not touch unless a pressure is applied to the knob.

Take a piece of fine magnet wire one foot long. Strip the insulation from one end, and wrap it tightly around the screw S. Then coil it up into a spiral and having stripped the insulation from the wire at a point 3 inches from the screw, twist the bare wire underneath the screw which holds the copper strip L in place. Finally connect the same wire to one binding post P. The screw S, the lever L and the binding post P are then connected together. Finally connect the screws T and W by a wire running in a groove on the under side of the board which runs to the second binding post Q. These connections are shown by dotted lines in Fig. 1. Adjust the screws S and R so that the lever B may move up and down about ⅛ inch.

QUESTIONS AND ANSWERS.

BACK NUMBERS:—To those of our readers who have been disappointed in securing back numbers to complete their files—we can supply all back issues (except No. 1) for a limited time.

E. Y.—The article you request on thermo-electric batteries will be prepared and published within a month.

SIMPLE TRAP FOR CATCHING INSECTS.

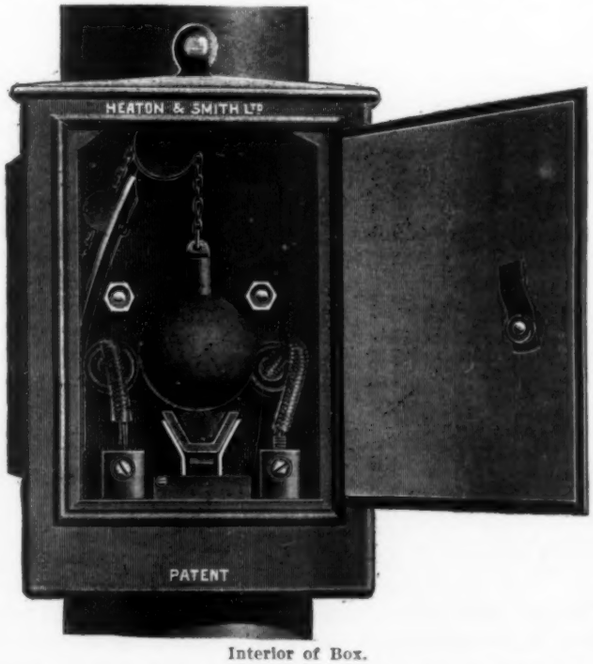
An acetylene lamp and a barrel are the principal constituents of a unique insect trap that has been invented by M. Noel, director of the entomological laboratory of Rouen, France. The trap is placed in the field or garden for the protection of vegetation, which in France as well as in other countries suffers great injury from the ravages of the insects in their larval state. Every one knows how insects will congregate about a lamp at night. The acetylene lamp is placed inside a barrel the inner bottom of which has been coated with tinfoil, which serves as a reflector. The barrel is placed on its side on a stand about three feet above the ground. The generator for the acetylene burner is placed somewhere under the barrel. Toward evening the inside of the barrel is coated with molasses and at dusk the lamp is lighted. The heat from the lamp escapes through the open bunghole above. The top of the lamp chimney is covered with metal gauze to prevent the moths getting in and perhaps extinguishing the light. The moths, attracted by the light, are immediately caught by the sticky sides of the barrel. Each morning the apparatus can be cleaned out ready for use another night.

ENGLISH DEVICE TO MAKE TROLLEY WIRES SAFE.

When a trolley wire, with its powerful electric current, breaks and falls in the street great care has to be taken that horses and people do not come in contact with it and receive a dangerous shock. An English device is being installed on the trolley lines

Breaking the Glass.

in that country to instantly shut off the current in an emergency of this kind. The mechanism is contained in an iron box attached at frequent intervals to the poles which support the trolley wire. In one side of the box is a glass window. Against the

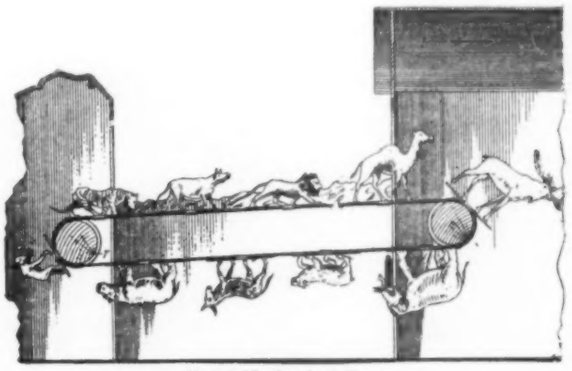


Interior of Box.

glass a spring presses, and when the glass is broken the spring flies out and in doing so throws a switch which cuts off the electricity from the fallen wire. Our cut shows a policeman in the act of breaking the glass.

MOVING ANIMAL TOY.

Inventors are devoting considerable attention—and some of them profitably so—to the construction of mechanical toys. The one shown herewith consists of an endless belt passing around



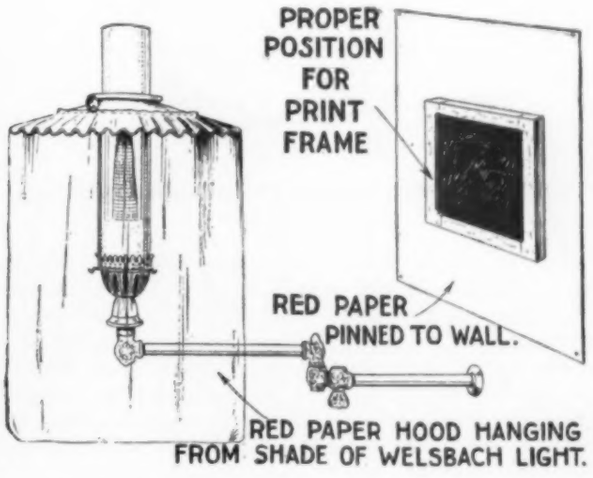
Novel Mechanical Toy.

two drums and propelled either by a crank or a spring. Various animals fastened to the belt pass across a miniature stage in rapid succession.

PRINTING OUTFIT FOR AMATEUR PHOTOGRAPHERS

In the Photo-Beacon for May appears the following:

Realizing that a great many amateurs have had the same trouble I have had in working developing papers, namely, that of the paper being fogged by exposure to strong light, both while filling the frame and developing, I have devised the following scheme: Fit a Welsbach burner with a hood of orange paper (as seen in Fig. 1) fitting loosely around the shade. If the paper is not put too close to the top of the shade it will not burn. Leave uncovered the side of the lamp that is next to the wall.



Now if your wall is dark colored, your outfit is complete, but, if it is light colored and you desire to develop under or near the Welsbach, you should pin a piece of orange paper on the wall as seen in Fig. 1. To produce a more uniform lighting on the printing-frame, line the inside of the hood with white paper. By this method you will get more light on your frame and will be able to develop very close to the lamp and still get a strong indirect light on your trays. This method can easily be applied to an oil lamp or an electric globe.

Popular Mechanics

H. H. WINDSOR, Publisher

Journal Building, - - - Chicago

SUBSCRIPTION

United States, Canada, Mexico and all U. S. Possessions, per year.....$2 00

Foreign Countries, post paid..... 3 00

Advertising rates, $2 per column inch per issue.

Popular Mechanics is an illustrated weekly review of the mechanical and engineering press of the world, presented in plain, simple language, and condensed as much as possible. We always credit publications from which illustrations and facts are taken. Where the name only of such publication is given, it indicates we have used practically the entire article. Where name of publication with date of issue is printed, we have made only a brief digest, and those of our readers who desire to study all the details of the subject should procure from its publishers, or their local newsdealer, the copy of that date

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POPULAR MECHANICS

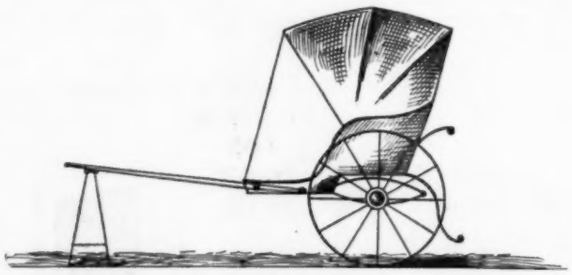
Journal Building, - - Chicago

Entered at the Chicago Postoffice as Mail Matter of Second Class.

CHANCE FOR AMERICAN VEHICLE MAKERS.

The old time method of transportation by men's shoulders in Madagascar is being done away with through the introduction of modern American and French vehicles. A great road 150 miles long is being worked over between the Tananarivo and the coast, and the French government has awarded the transport service to Mr. Edouard Giquel. William H. Hunt, American consul at Tamatave, says:

"It is creditable to our manufacturers that the first wheeled



The Pousse-pousse.

vehicles to carry goods up country here were American, and that these wagons have stood the test and wear better than any others, and have given entire satisfaction to the owners."

The French pousse-pousse, a favored vehicle in Tamatave, is finding a formidable competitor in a similar vehicle made in America. Mr. Giquel has found that the latter is the strongest, lightest and most durable and is desirous of corresponding with American vehicle manufacturers. His address is Mr. Edouard Giquel, Tamatave, Madagascar.

ANTS UNDERMINE PAVEMENTS.

Sidewalks and pavements in Council Bluffs, Ia., are being rendered unfit for traffic by ants. They began burrowing beneath the bricks and macadam at early spring, completely undermining some of the pavements for blocks. The city engineer is busily repairing the damages and incidentally is seeking a means of destroying the ants.

STREET TRANSFORMING STATION.

In the electricity works which are operated by the city of Karlsruhe, Baden, the three-phase electric current is generated at 4,000 volts and distributed through 40 miles of high pressure

Street Transforming Station.

cables to all parts of the city. At necessary intervals transforming stations are placed, 70 in all, which reduce the current to the usual voltage for city use. Forty-four of these stations are placed on the sidewalk and called "towers." The London Electrical Review says: In the interior three switchboards are arranged in the form of a triangle, and the tower itself can be revolved, so as to give access to all the gear, one door only being necessary. This door opens opposite the low-pressure board, and the tower can then be turned into the second position for the high pressure gear, and to the third, which allows for easy inspection or replacement of the transformer. The great advantages obtained by this simple arrangement are at once apparent, as regards both safety and convenience.

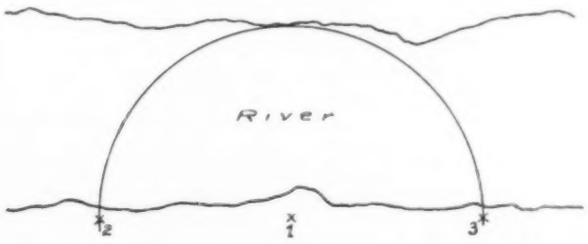
Dr. Unschutzkaempfe of Vienna, proposes to reach the North pole in a submarine vessel, breathing oxygen renewed chemically. He will go as far north as possible in an ordinary Arctic vessel, and then embark in the submarine boat which he is now having built.

Should all the electric railways for which charters have been asked be constructed there will be no less than 1,046 miles added to the rural electric railway mileage of the province of Ontario.

Fire chiefs from all over the world will attend the exhibition of fire apparatus at Cork, Ireland, Aug. 4.

MEASURING THE RIVER'S BREADTH.

Editor Popular Mechanics: In your issue of May 17th, page 295, in the article from Marine Journal: "To Judge a River's Breadth:" Why should the author have the civil engineer (who happens to be caught without his tools or implements) to turn half around with his back to the river, when by turning only one-fourth around either way with one side to the river, until his hat brim cuts the water line at the edge of his side of the river he has a better level on which to measure his distance



than he is ever likely to find on the land back of the river? And even if it were necessary to turn inland at all, then the first level stretch (or the most nearly level stretch) of land from where he stands at the brink of the river is the point for him to stop and take measurements.

If he stands at Fig. 1, and adjusts his hat brim to water line on opposite shore, then turns steadily until the brim cuts the water line at 2, and takes measurements, then standing again at 1, and turning until the hat brim cuts the water or shore line at 3, he has a chance to verify or correct his first measurement; and so for each strip of level land from 1, he could take another measurement if accuracy were of any special consequence.

J. H. Millholland.

Charleston, Ill.

THE WIRELESS TELEGRAPHY SITUATION.

"An international conference on the subject of wireless telegraphy seems to be inevitable," says the Electrical Review in an editorial of May 10. This it is believed, will be the only means of settling the antagonistic confusion over the new invention that now prevails throughout the world. In the course of the editorial, the Review says:

"What is evidently coming is a long and hard-fought legal battle between the various patentees. It seems today as if some of the more spectacular results that have been obtained have been due to the use of secret methods and not to those disclosed in the patents on file in the various patent offices. It is claimed by several inventors that a more or less perfect method of tuning or selective signaling has been invented, although the details have not been made public. Until this is done it does not seem unwise to look somewhat askance at the claims so often made and so loudly reiterated without the kind of demonstration that appeals to the engineering fraternity. For military and naval purposes the value of wireless signalling will probably be much greater in time of peace than in time of war. The signals are so easily interfered with that a method of disturbing them would be extremely easy to apply. Selective or tuned systems will be of no earthly use for marine purposes. What seems to be needed in sea signaling is a universally applicable method by which a vessel in distress could send out its call for help in such a way that it could be received by any other ship provided with any variety of wireless signalling apparatus that happened to be in range."

Waterproof shirts and hats are made from salmon hide by the Eskimos in Alaska. They also cut from codfish skin, jackets which are said to be very serviceable garments.

ENORMOUS COST OF FUEL FOR LOCOMOTIVES.

"The fuel amounts to the enormous figure of 30 per cent of the total expense of locomotive operation, including renewals and repairs," says A. D. Parker, general auditor of the Colorado & Southern Railway, "or as much as the wages of enginemen, hostlers and wipers and cost of lubrication combined; or 6 per cent more than the next greatest item of expense, the wages of enginemen. It further amounts to 12¼ per cent of the total expense of operating a modern railroad.

"With grades slight and weather conditions favorable the consumption is dependent upon the gross tons hauled and the speed made. At a speed of 12 miles an hour, under such circumstances, a ton of coal will haul from 8,000 to 12,000 ton miles. If this figure is reduced to miles run by a locomotive whose hauling capacity is 960 tons, there will be shown from 13 to 15 miles run per ton of coal. Switch locomotives consume from 1½ to 3 tons per day of 12 hours. The average price per ton of coal, which covers the cost at the mines plus the expense of handling, varies from $1.25 to $2.50. In this price there is no charge for moving coal over the line of the purchasing company."

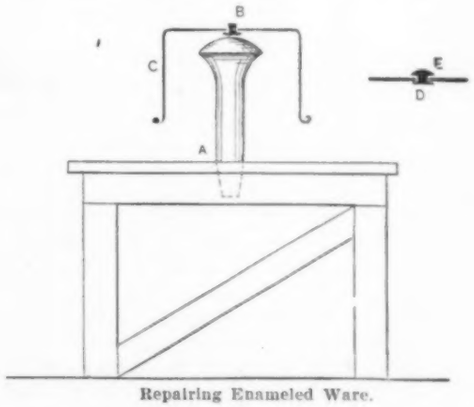
TWO MEN WEAR ONE PAIR OF SHOES.

Two old grizzled men entered a New York shoe store together. Both used crutches, says the Shoe Trade Journal; both had lost a leg apiece. One had his right leg off above the knee, the other had lost his left leg below the knee. They sat down and bought a $5 pair of shoes, 7½ size, D width. They put on a shoe apiece.

"I'm a G. A. R. man and so's my friend," said one of them. "I lost my leg at Gettysburg. My friend lost his in the Adirondacks, rolling logs, after he had served through the war. We met a few years ago at a G. A. R. post reunion and swapped leg stories and agreed to buy boots and shoes in cahoots as our feet are nearly the same size."

REPAIRING ENAMELED WARE

It is difficult to solder a leak in enameled ware, says the Metal Worker. It may be repaired, however, by opening the leak hole with a small reamer to the size of a 1-pound soft tinned rivet. Then place a rivet, B, on the round headed stake A, and put



Repairing Enameled Ware.

the vessel C over the rivet where required. The rivet should then be spread with the hammer, as shown by D, setting it down well with the rivet set, as at E. If a soft rivet is used the opening in the vessel will become perfectly tight without any soldering.

In lighting the beacon lights in the upper Mississippi gasoline launches have taken the place of row boats.

AN AUTO LAWN MOWER.

The small boy will no longer shy when his father suggests that the grass in the front yard is getting long, if the latest invention in lawn cutting comes into general use. The American Artisan describes a motor lawn mower which is primarily intended for use in parks, cemeteries and places where a large amount of cutting is required. One of these motor machines will do the work of 20 hand machines.

Cutting Grass in Style.

FAVORS RUBBER TIRES FOR FIRE WAGONS.

Chief Baxter of the Philadelphia Fire Department says that he favors the use of solid rubber tires for fire engines instead of the heavy steel tires now used. He believes that the first cost would be saved in repairs and sparing of horses. This conclusion is arrived at after experiments with rubber tires on heavy public vehicles in Philadelphia and New York.

TO KNOW WHO BLEW UP THE MAINE.

Senator Mason has introduced a bill for the appointment of three naval experts, such as Admiral Dewey, Capt. Sigsbee and Lieut. Hobson, to superintend the raising of the Maine, so that the country may know who was responsible for the destruction of the battleship. The bill provides for an appropriation of $100,000 for removing the wreck from Havana harbor and $50,000 for the expenses of the commission. There have been all kinds of charges relative to the blowing up of the Maine, but as yet absolutely nothing reliable is known, and the act that brought on the Spanish-American war is still shrouded in deepest mystery. It was charged by people of the United States that Spaniards committed the deed through malice. Some have claimed that it was the work of Cubans, who thus schemed to lay the crime on Spain and enlist the aid of the United States. It has been charged that it was the work of Englishmen, who sought to bring on the war. But the most serious charge, made by some Spanish officials, is that the blowing up of the Maine was a preconcerted plot on the part of United States officials to afford grounds for war and to arouse the people against Spain so as to lessen the censure.

STEAMER WRECKED WITH $1,500,000 GOLD ABOARD.

The German steamer Sakkarah, with $1,500,000 in gold specie on board, has become a total loss at Huamblin Island, off the coast of Chile. The specie was being remitted by the Chilean government to Hamburg, Germany. The Sakkarah belonged to the Cosmos line of Hamburg. It was a ship of 2,965 tons, built in New Castle, Eng., in 1897, with a length of 365 feet, breadth of 46 feet, and drew 27 feet of water.

ONLY ONE PAIR OF THESE SHOES EVER MADE.

A style of foot gear, unlike anything ever worn before in the history of the world, has just appeared in the shape of what is called "twenty-strap sandals," a pair of which were made especially for Anna Held. They cost the actress $50, and are the only pair ever produced of the kind. Hervey E. Guptill, Haverhill, Mass., were the manufacturers. The sandals were cut from Corona kid, which the manufacturers say was the only patent leather found with sufficient strength, light weight, spread and luster to give satisfaction. The exact size and measurements of the boot are as follows: No. 3½, D width, ankle 8½ inches, calf 14½ inches, knee, 13½ inches, top 23 inches, height 26 inches.

Twenty-strap Sandal.

Manual San Clemente, president of Colombia, who was practically deposed by the vice-president, Dr. J. M. Marroquin, in August, 1900, died at Viletta, March 19, at the age of 90 years.

THE AUTOMOBILE KITCHEN. THE LATEST.

An "Automobile kitchen" that will serve meals hot to the occupants of residences, office blocks and apartment buildings where cooking is not permitted is to be the latest thing in the horseless wagon line in America. Such a service, which has already been successfully tried in England, is proposed for New York and Chicago. In London the device is called an "Electric Kitchen Car." When the new service is installed it may do away with kitchens altogether in the finer houses. The machine is itself a kitchen on wheels which prepares meals in transit and brings them to the houses and apartments as ordered, hot or cold, and at exactly the time desired. Theodore G. Chambers, managing director of the British Electromobile Company, Ltd., in the Electrical Review, says:

"The Distributing Kitchens, Ltd., has been running a constant service of dinner deliveries throughout the entire winter. The service has given great satisfaction, no failure to deliver up to time having occurred on any single occasion during the term of contract, which says much for the reliability of the electric car. The company will soon put a large number of cars in service."

A HORSELESS, DUSTLESS STREET SWEEPER.

A Chicagoan claims to have invented a "horseless, dustless street sweeper." His name is Peter Green, formerly a city inspector, and no relative of Darius Green, of flying machine fame. The motive power of the device is to be a gasoline motor. A system of fans which operates with suction tubes will take up all the dust.

MAKE PAPER FROM SUGAR CANE REFUSE.

Experiments made at the sugar factory of Mr. Cunningham, at Sugarland, Tex., near Houston, have demonstrated that the refuse of sugar cane, known as bagasse, may be made to yield a superior quality of light and heavy wrapping paper of splendid texture and strength. The Southern Industrial Review says:

"The supply of bagasse in Texas and Louisiana is almost without end, and it is possible that the waste may be so utilized as to produce paper for printing and thus partially take the place of wood pulp."

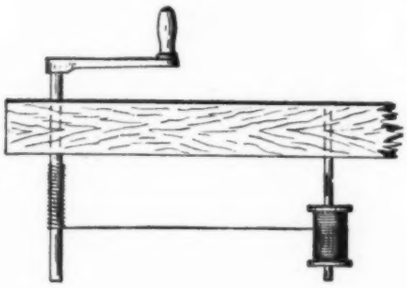
WHAT THEY SAY.

"I am very much pleased with Popular Mechanics, 'written so you can understand it.' Commence my subscription at once and begin with the first number." Ernest Schmid, Zurich, Switzerland.

SHOP NOTES

HOW TO HARDEN BRASS AND MAKE SPRINGS.

Brass can be hardened by hammering or running through rollers while cold, says the American Blacksmith. To make a coiled spring, say a 5-16 spring, take a ¼-inch iron rod, put a crank on it or bend to



shape of crank and let it run out at one end. Bore a hub in a block of wood so the iron will fit tight, and run it through, fasten your wire on it and wind it on by turning the crank, having your spool post so you can hold it tight enough to seretch the wire.

FEEDING BOILER COMPOUNDS.

In the May Power, J. P. Cosgre describes a device he has made and used with good results for feeding solvents into boilers. He says:

By observing the gage glass the feed can

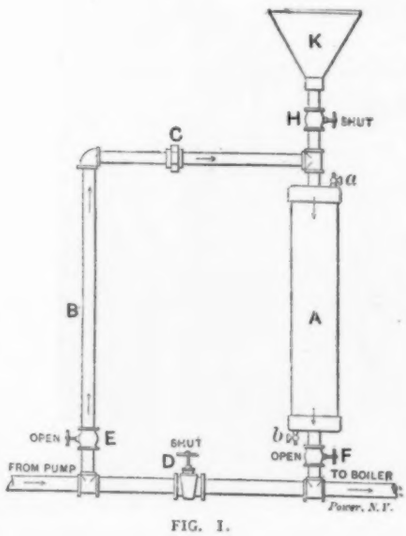


FIG. 1.

be regulated quite accurately, and once the desired average flow is obtained, the handwheel on the globe feed valve D should be marked for future reference.

The flow of the feed water about the tip F in the direction indicated seems to create an increased rate of flow of the solvent, as more water is delivered through the feed pipe. This has not been accurately determined, but the tendency has been in that direction, so far as observed. The tip F is not reduced, but left full size, ½ inch.

Water for mixing is obtained by opening C. After receiver has been emptied of the solvent, the remaining water should be drawn off, leaving the receiver quite empty, then with valves E and D shut and valve A open, fill receiver with the solvent

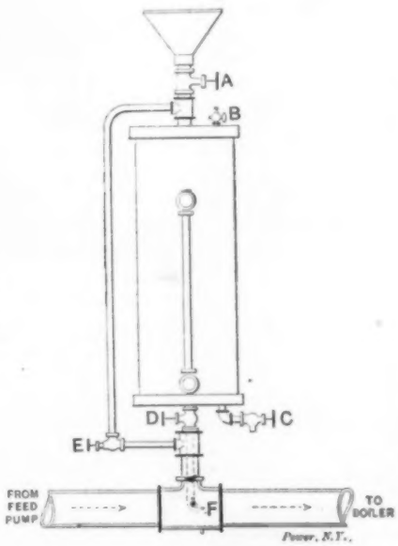


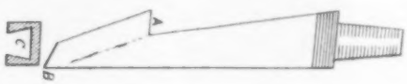
FIG. 2.

mixed to the proper consistency, air cock B allowing the air to escape, then close A and B, open E and give D about a quarter turn open and the machine will deliver its contents slowly and steadily.

CORE-DRAWING MORTISING CHISEL.

A writer in the Wood Worker thus describes a handy tool which any mechanic can easily make.

Take an ordinary chisel and file the bottom of groove a trifle wider than top, as indicated at C in sketch, and a trifle wider

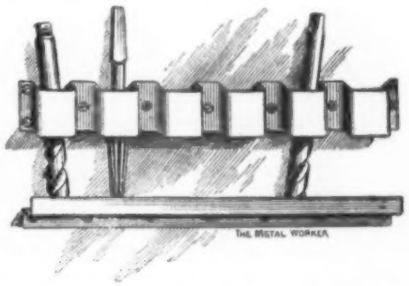


at A than B, he will have no more trouble with tight cores. A long bevel on inside edges, as indicated by dotted lines, also blunt bevel on lips, will greatly improve the drawing qualities of the chisel.

Admiral Schley said: "I regret much the death of Admiral Sampson and I sympathize with his family. No one has ever heard me utter an unkind word against him."

SIMPLE TOOL RACK.

There are many styles of tool racks, but the one shown in the accompanying illustration seems to be of most general use and is gaining in popularity. The Metal



Worker says: "This rack consists of a strip of tin bent, as shown, to receive the different tools. To prevent the tools from slipping out, a little shelf, also made of tin, is nailed under the rack at the proper distance."

THE LITTLE KINGDOM OF KRUPP.

The growth of the small kingdom, governed by Friedrich Alfred Krupp, the great German steel gun manufacturer, from nothing to 200,000 people in three generations is unique in Europe. The colony at Essen is to a great extent co-operative. Every Krupp worker can rent a dwelling suitable to his station at less than the ordinary rates. The stores are entirely managed by the consumers. Education, from the primary grades to the most advanced technical and academic studies, is furnished free. The wealth of the present Krupp, Friedrich Alfred, the grandson of the man who spent his life in the search for the secrets that have so greatly enriched his offspring, is enormous. The industry yields an annual income of more than $4,000,000, greater than that of the German Emperor. He owns thirty full trains of cars, fifty locomotives, ten ocean liners, more than a hundred coasting vessels and a railroad with as many miles of track as the New York Central. Yet the condition of Krupp's employes is said to be ideal. Individual effort is encouraged and intelligent work rewarded. The father of the present head of the concern was Alfred Krupp, inventor of the Krupp gun.

TO CUT ENDS OF STEEL TIRES.

I have a simple way of cutting off ends of steel tires, or any iron, with the aid of a helper, writes J. L. Painter in the American Blacksmith. I take a heavy three-cornered file and break it up into two or three-inch lengths, and draw the temper, when they are ready to use. I lay the file on the anvil and place the tire on top and have the helper strike, after which I turn the tire, give it another blow and off it comes.

AMERICA IS PROUD OF ALASKA.

Alaska is rapidly becoming one of Uncle Sam's most important possessions. Since 1896 the Klondike gold fields have been discovered and the country newly populated; gold amounting to $75,000,000 has been taken from the Yukon region; the acquirement of the Philippines has given great importance to a direct route along the Alaska coast between North America and the new possessions; the discovery of gold on the beach at Nome brought 30,000 people to this part of Alaska and resulted in an output of $5,000,000 of gold annually or more than twice as much as all Alaska had previously yielded; the Alaska Salmon Fisheries, in their infancy in 1896, says Harrington Emerson in the Engineering Magazine for May, have grown in 1902 to great companies, capitalized for $20,000,000, with net earnings last year of more than $2,000,000 and employing 10,000 men; two railroads have been built, one of which cost $4,000,000 and last year earned $3,000,000 net; the other a little road five miles long earned $80,000,000 net; new coal fields of great value have been discovered.

MORGAN SMOKES CIGARS 8 INCHES LONG.

J. Pierpont Morgan smokes large cigars as a rule, but since his visit to Jekyl Island he has added to his possessions a style of cigar that is at once a novelty and a wonder. He gave one to Douglas Robinson, real estate dealer and brother-in-law of President Roosevelt.

Mr. Robinson made a short call at Mr. Morgan's office, and when he was leaving Mr. Morgan pulled out of his desk a box of his new brand of cigars.

"What do you call these?" said Mr. Robinson. "Smokelets?" he inquired, as Mr. Morgan tendered him one.

"A new style," said Mr. Morgan. As Mr. Robinson went out of the office, across Wall street, he attracted general attention. Men hurrying home paused a moment to look at the huge cigar. It was fully eight inches in length and correspondingly thick.

On the seal were Mr. Morgan's initials, "J. P. M."

CORRECTING NORMAL CLOCKS.

The proposed determination of the difference in astronomical longitude between Paris and Greenwich is now in progress nightly. The observations of the two cities are connected directly by telegraph for the purpose of ascertaining accurately the difference between the normal clocks.

Th two French astronomers, MM. Renan and Bigourden, who are conducting the experiments in Paris, intend shortly to interchange stations with the two English astronomers at Greenwich in order "to make allowance for the personal equation."

Such extreme care is being taken to insure perfect accuracy that the normal clocks at each end are corrected by means of astral observations before the results are recorded.

Numbers of French scientists gather each night at the observatories to watch the experiments in the belief that the important astronomical correction is about to be ascertained.

LABOR IN MEXICO.

Labor in Mexico is apparently cheap but is really about three times as expensive as in the United States. Contractors state that an American mason at $8 per day Mexican silver ($4 American money) will do as much work as 20 Mexicans at $1.25 per day. A Mexican bricklayer will lay on an average of 200 bricks per day; an American will lay 3,000 per day. The Mexican brick layer will require two or three tenders while an American tender will attend to two American bricklayers. Consul General Barlow of Mexico city says:

"Any American who works for a salary can earn as much in the United States as in Mexico, and in the United States he can enjoy many advantages that he cannot enjoy here. Mexico is a bad place for a young inexperienced man without ample funds in any line he chooses to follow. No man working for a salary should come to Mexico without a definite engagement in advance at a better salary than he is able to earn in the United States or without sufficient funds to live for several months while seeking employment and with which to return to his home if unsuccessful in finding work."

There are 4,800 millionaries in the United States, New York state having more than any other, 1,045; Massachusetts, 475, and Illinois 280. North Dakota is the only state that cannot boast of more than one.

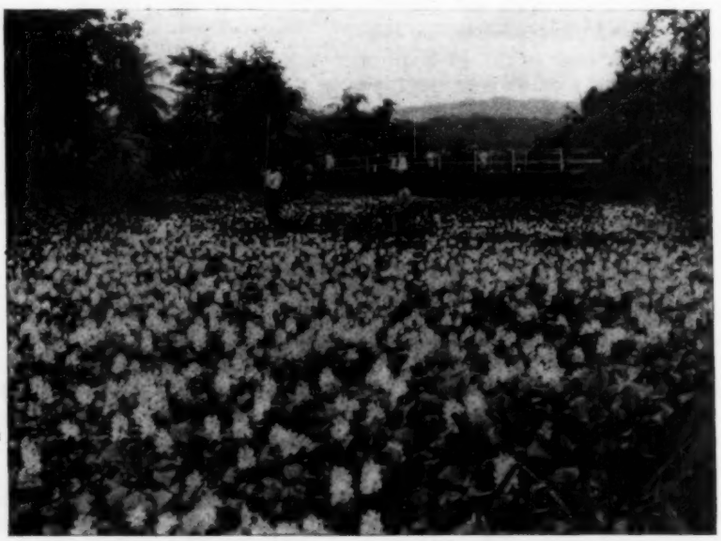
SAY ISLANDS MAY SINK IN THE SEA.

Jamaica, Princess of the Antilles, the Most Beautiful Spot of the Volcanic Area.

One of the most important and picturesque of the West Indian Islands, which

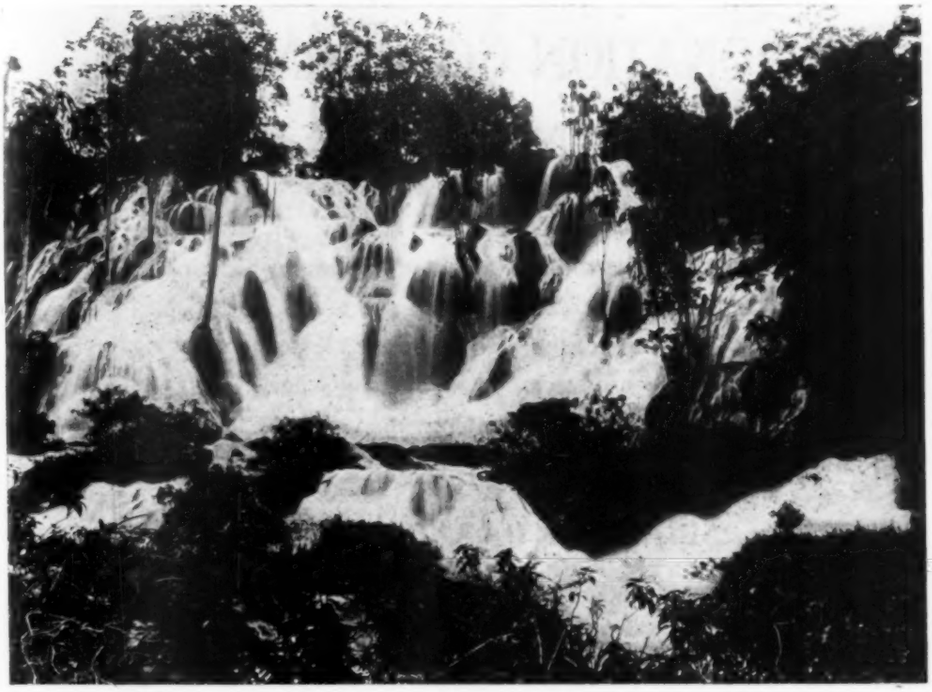
Rafting—A Popular Sport.

are now attracting world wide attention because of the recent disastrous earthquakes, is Jamaica, known as "the princess of the Antilles." This island and its unequalled scenery has long been a favored resort for American tourists in winter time. According to Prof. Angelo Heilprin, the eminent authority on volcanology, Jamaica, with the other islands of the West Indian reef, may sink into the sea from the effects of the recent eruptions of Mont Pelee and the Soufriere. All the island of Jamaica is of volcanic formation. Prof. Heilprin says:



A Wonderful Field of Hyacinths.

"The volcanoes of Martinique and St. Vincent and of the neighboring islands of the Caribbean, are situated in a region of extreme weakness of the earth's crust, which has its parallell in the Mediterranean



Roaring River Falls.

basin on the opposite side of the Atlantic. This American region of weakness extends westward from the Lesser Antilles across the Gulf of Mexico into Mexico proper, where are located some of the loftiest volcanoes of the globe.

"Volcanoes of Costo Rica, Nicaragua and Guatemala have been repeatedly active, some almost to the present time, many with destructive effect and it should be no surprise to have some of them burst out with vigor and intensity as Mont Pelee or the Soufriere. The constant eruptions of rock, lava and ashes, you must know, means that a hole, as it were, is being made in the bosom of the earth. When this hole reaches a great size, that which is above will be without support and then subsidence must follow."

Every winter hundreds of Americans visit Jamaica on board the ships of the United Fruit company's fleet. Jamaica is the home of the Roaring river falls, which many declare to be a grander spectacle than Niagara. Here beautiful hyacinths grow wild and are often cultivated in great fields by the natives who sell them to tourists. Rafting in the swift currents of the mountainous streams is among the principal sports of the natives. The tourist world is awe-stricken by the prediction that fair Jamaica may be buried under the sea.

Cutting Sugar Cane.

AMERICA'S ENORMOUS PRODUCTS.

Enough coal was produced in the United States last year to give three and a half tons to every one of the 76,000,000 men, women and children in the country. The gold output was enough to give every one of these inhabitants a gold dollar. If all the petroleum produced during the year were put in standard barrels, placed in a row touching each other, the line would completely belt the earth.

AUTOMOBILE STAGE LINES IN MANY STATES.

Automobile stage lines have been established or are to be established in many states, according to information in the Motor Age. They are as follows:

Michigan: Between Detroit and Belle Isle, promoter, Eugene D. Whitney, of Detroit; between Pontiac and Orion, and between Mt. Clemens and Lakeside. Nebraska: Automobile rapid transit line between the Burlington depot at Lincoln and Bethany. New Jersey: Between Long Branch and Asbury Park, Augustus Chandler and others, promoters; between Cranbury and Trenton and between Highstown and New Brunswick. Missouri: Between St. Louis and Creve Coeur. Tennessee: Between Smithville and Watertown in DeKalb county. Texas: Between Alice and Brownsville, a distance of 100 miles. Connecticut: The Woodbury stage line, now in operation, Messrs. Stockbine and Boyd, promoters. California: Between San Jose and Alviso, Los Gatos and Saratoga, and a line near Bakersfield to connect the Southern Pacific and Santa Fe railroads. South Dakota: Proposed line at Sioux Falls, instead of electric line, Clark Coates, promoter. Georgia: Street line at Macon. Oregon: Between Portland, Gresham and Mount Hood. Wisconsin: Between Milwaukee and Cedarburg. Ohio: From Hillsboro to Chillicothe. Iowa: Between Dubuque and East Dubuque. Indiana: Between Redkey and Dunkirk. Pennsylvania: Between McKeesport and Riverview Park. New York: Stage route in Brooklyn along Ocean avenue, Patchogue. Illinois: Auto-bus line between the heart of the city and depots, now in operation, and proposed line to the North Shore.

OPENING FOR AN HONEST MAN.

A Chicagoan went to New York recently and ran across his old friend John W. Gates.

"Hello, Jim, and what are you doing here?" asked Gates.

"Well, I am tired of being supported by my father, and thought I would come to Wall street and try to earn an honest living. Do you think there is any chance for me?"

"Well," said Gates, after thinking a few minutes. "There ought to be—you won't have much competition."

FIREMEN OUTNUMBER SOLDIERS.

There are more firemen in the United States than there are soldiers in the standing army. New York has 6,100 firemen; Chicago, 1,200; San Francisco, 430. There are 65,000 paid firemen in the United States and 100,000 volunteer firemen.

A MILLION OF MILLIONS OF YEARS REQUIRED.

Prof. Woodward contradicts the assertion that the length of the day will ever change to an appreciable extent. He says that the duration of the day has not changed as much as half a second during the first 10,000,000 years after the beginning of the solidification of the earth's material. When the cooling of the earth finally reaches its term, he says, the change will be marked. Three hundred thousand millions of years are required for 95 per cent of the total contraction to take place. The length of day will not be sensibly affected for 1,000,000 millions of years. The fall of meteoric dust, he claims, tends to increase the mass of the earth, and thus to change the length of the day, but the effect due to this cause is not one two-hundred-thousandth of the effect of secular cooling. Taking everything into consideration, he says, the day will shorten, not lengthen, but the process will go on with extreme slowness.

WHY AMERICAN ENGINES LEAD IN EGYPT.

A parliamentary paper issued in London gives a report from Lord Cromer as to why so many orders for railroad plants in Egypt have been given to the United States in preference to Great Britain. Lord Cromer's explanation is that the American firms are able to execute the orders with such superior rapidity, due largely to the system of standardization. In respect to price Lord Cromer finds that the British can hold their own where special designs have to be executed. The quality of the British work, he says, is at least equal and often superior to American. Continuing he says:

"In consumption of coal the British engines have a decided superiority over the American, though not over the Belgian engines. The British manufacturers's weak point is delay in executing orders. The American tenders promised delivery in one-third of the time required by the British firms, while they offered to supply standard locomotives of equal suitability 10 per cent below the British price, though the latter's tenders for locomotives built on Egyptian specifications, were lower than the American offer."

THREW OUT THE WRONG BOOT.

Old boots and shoes and rice were showered at a young married couple of Fenlon Falls, B. C., as their train pulled out of the depot. After they were comfortably seated the groom noticed a boot which he thought had been thrown into the car by some of his jovial friends. He merrily tossed it out of the window while the train was speeding along at a 50-mile gait. A commercial traveler sitting in an adjoining seat immediately arose and began to remonstrate. It developed that the boot had an exact counterpart which was worn on the other foot of the traveler and he had removed this one because of a painful corn. The groom bought a new pair of boots for the traveler at Toronto.

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GOOD HEALTH EARNS MONEY.

The better a man's physical condition the greater his earning ability, whether he labors with the muscles or the brain. Frederick W. Stone, athletic instructor of the Chicago Athletic Association, says:

"A man full of energy, keen, alert, with every nerve and muscle under perfect control, will be a power wherever he is; and nowhere will the difference be felt with greater satisfaction than in his income.

"The employer of today knows which of his men are capable and energetic, and he will not fail to appreciate the value of an employe who feels genuine interest and does his work with a will. We are living in a strenuous time and the man with force and stamina is the man who will win out."

Exercise is given by Prof. Stone as the prescription for health. He condemns paraphernalia and all patented exercising apparatus as unnecessary. Ten or fifteen minutes a day will suffice, he says, with as much walking as you can do and the use of common sense.

The new union station of Washington will be one of the finest of the world. It will be built of white marble and will cost $5,000,000.

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THE VILLAGE RUBBERSMITH.

Under a spreading blacksmith sign,
The village blacksmith sat;
He heard the chuf-chuf-chuf and said,
"Where is my business at?
The road is full of horseless things,
And bikes and such as that."

The smith was deeply in the dumps;
Ah! that was plain to see.
His wink-eye winked a knowing wink
Up at the chestnut tree;
And then he said, "These horseless things
Have put a horse on me."

And through his crisp and curly hair
His sinewy hand he ran,
Says he, "I'll get some different tools,
As well as any man
I'll mend a punctured rubber tire—
I'll charge whate'er I can."

He fixes up a charging plant
To work at sixty amps.
He charges automobile cells,
Keeps pumps and oil for lamps,
In fact, there's nothing he don't sell,
From sparking plugs to gamps.

Week in, week out, from morn till night,
His bellows blow no fires,
Instead it feeds a rubber tube,
That blows up rubber tires.
He has a tank of gasoline,
And cement, pipes and wires.

And children coming home from school
Rubber in at the open door,
They rubber at the rubber tube,
A-rubbering 'round the floor,
They rubber at the rubbersmith,
Who rubbers tires that tore.

He can't go, Sunday, to the church,
For that's his busy day.
Some city chauffeur's in the lurch,
And here is work—and pay.
The chauffeur buys some gasoline
And chuf-chufs on his way.

But never mind, his daughter's there,
Up in the choir stand;
And as she holds the hymn-book high,
Shows diamonds on each hand;
For daughter's buying jewelry
And Dad is buying land.

Repairing, pumping, mending,
Onward through life he goes,
Each morning sees some tire break,
Each evening sees it close.
Something mended, somebody done,
Puts money in his clothes.

Thanks, thanks to thee, my worthy friend,
On the lesson I'll meditate.
All must at times get different tools,
This world will never wait;
If we would live the strenuous life,
We must keep up to date.

China produces more silk than any other country in the world. Last year China exported 24,607,000 pounds; Italy produced 7,398,600 pounds; Asiatic Turkey, 2,059,200; France, 1,232,000 pounds; India, 770,000; Caucasus, 682,000; Austria-Hungary, 607,200 pounds; European Turkey, 528,000 pounds; Persia and Turkestan (export), 528,000 pounds; Spain, 171,000 pounds; Greece, 74,800; total, 38,658,400 pounds.

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Attractions for Next Week.

At a St. Louis convention recently the northern men criticised the southern men for not employing more negroes in the cotton mills, and not giving them better jobs. Next week a southern man who has had much experience with negroes and cotton mills will make reply. It will be in Popular Mechanics.

Did you ever stop to think of the awful speed with which two of the modern fast ocean liners approach each other when they are coming from opposite directions? This fact renders danger of ocean collisions much greater than it used to be. Now vessels, when they first see the lights of each other, scarcely have time to change their course, before they are in collision. Read about it next week.

A great mechanical mole that burrows its way underground traveling as fast as a man can walk, is the latest thing to be invented. With the air ship and the sub-marine boat this is about all that is needed to make man in truth master of all that is on the earth, in the air, under the earth, in the water and under the water. We will tell about it in the next issue.

Around the world in an automobile, is the novel trip to be made by a couple of Europeans. You ought to read about it in the next issue. Leipsic is to have a depot to cost twenty-six million dollars. When the tide went out in Alaska a short time ago the beach was strewn two feet thick with herring. Canada is making so much money selling frogs to the United States that she is going into the business on a mammoth scale. It looks like Switzerland is to be the first nation to have real electric railroads. Every one of these things and four times as many more, all equally instructive and entertaining, will be in Popular Mechanics next week. Some people say it is the most interesting paper published.

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NOTICE TO NEWSDEALERS.

One newsdealer in Chicago who started with 5 copies a week in February last increased his sales to over 300 copies a week during April, and will average 400 a week for May. He is a very busy man; did not push the paper or ask a single customer to buy one. He keeps 8 copies displayed in his window; has a crowd there all day long. The display does the rest. Write us for window poster free. Popular Mechanics, Journal Bldg., Chicago.